

FEBRUARY 13, 1922

AVIATION

VOL. XII. NO. 7

Member of the Audit Bureau of Circulations

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THE GARDNER, MOFFAT COMPANY, Inc., *Publishers*
HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

Subscription price: Four dollars per year. Single copies fifteen cents. Canada, five dollars. Foreign, six dollars a year. Copyright 1922, by the Gardner, Moffat Company, Inc.

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

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Vol. XII

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The Eternal Crank Invention

It is a truism, as has been claimed, that a genius is but a second mouse in a machine, a "crank invention" being the first mouse to a real inventor. At any rate he is an interesting species, with a very wide distribution. There is no race, country, or age where he is not in evidence, but his favorite field is unquestionably aeronautics.

Now we have another "vacuum siphon" with apparently big ideas of money being spent on it, when it would take but a half an hour for any good engineer to prove it absolutely out of the question, with present day material. But someone says "why enlighten the poor man? After all he may be right and the rest of us all wrong." Quite true, but if such a miracle should come it would only prove that he was not a crank inventor after all. He who is satisfied to abandon an invention with mere objections based on engineering necessities is himself the crank. The same person would probably claim as "foolishness" any theories of government with which he was not in sympathy.

The crank inventor, like everything else, is relative. Broadly speaking, he is simply a state of mind. In his elementary form he looks only a certain prospect. The trouble is identified by faulty education and undisciplined "practical experience." But the faulted type only seems to appear after prolonged work on some particular idea or design. After long hours the inventor feels himself to be in a state of nervous exuberance. His real mental energy is now confined to persistent elaboration of the same old fantasy. Expert opinions and natural laws are adding to him. His system, if he has any, outside of ideas first and nervous exuberance is incapable of making a quantitative analysis of his own idea, consequently, or of taking anyone else's word for it.

The trouble with the crank inventor is not that he makes mistakes but that he sticks to them. The vacuum siphon idea was creditable enough for Father Lema in 1870 but in these days it can only be attributed to a vacuum mind.

Soaring Flight

THE interest which is displayed in various quarters in this country toward the problem of sustained flight—a new venture term including both gliding and soaring flight—is highly gratifying to those who believe, as we believe, that sustained flight is bound to become an important phase of aviation. Experiments are being conducted in various sections of the country, and the main difficulty seems to be that the various experiments are not independent means for gathering reliable information as to what has been actually achieved elsewhere, and what types have passed the most satisfactory soaring machines.

The article dealing with this subject which appears in this issue endeavors to supplement this deficiency. On the other hand there seems to be an urgent need for a national association of "soaring fliers," which would coordinate the new

soaring efforts and keep its members advised of the latest developments. Such an association might take the shape of a federation of the existing model airplane and soaring clubs. We understand that one such program is already under way, and it is to take shape before long, so no movement may be looked forward to in the near future.

Aircraft as a Civilizing Medium

THE Washington Conference, just closed, has added a very important thought to the concept of the function of aircraft. The report of the Committee on Aircraft used in part, "It must be distinctly understood that if the Conference decided to limit the development of commercial aircraft in order to retard the development of war power, the immediate result will be the retarded development of means of transportation and communication which will result, if accelerated, largely not to bring about the same result, the removal of some of the causes of warfare." * * * * * Any limitation as to number and character of civil and commercial aircraft, heavier-than-air or lighter-than-air, which is sufficient to hinder their utility for war purposes, must interfere disastrously with the natural development of aeronautics for legitimate civil and commercial enterprises. To limit the science of aeronautics in its present state is to shut the door on progress."

The concluded opinion presents a view of the function of aircraft as a civilizing medium that is frequently forgotten or neglected. Modern civilization is vitally dependent on transportation and communication. The present organization, furthermore, demands an ever increasing rate of speed. In the transportation of intelligence we have already reached the theoretical limit, the speed of light. In the transportation of food, manufactured goods and people we are just beginning to realize the possibilities. The higher the speed of transportation the more life becomes on the earth. Also the understanding between peoples becomes greater in the same ratio, and peace is dependent on international understanding and cooperation.

Flying Meets

THE coming year will undoubtedly show us a great many flying meets all over the country. Many of these meets will be only a few days apart or at most a week or two. This brings up the thought that many of the enthusiastic and ambitious will fly their machines from one to another of these flying meets. If the dates of the various meets were properly arranged it would be possible for a company to enter a set of machines in practically all the meets during the flying season by flying them from one meet to another. This point should be taken into consideration by chambers of commerce, Aero Clubs, etc., who are contemplating arranging a flying meet in their locality.

Lessons of the Fall Flying Meets

Experience of Minneapolis, Kansas City, Omaha and Baltimore Meets Teaches Value of Strong Central Organization and Attention to Details

By H. Wallace Koller

The significance of the important flying meets held last fall at New York, Omaha, Kansas City and Baltimore hardly seems to call for a critical study of these meetings, to have been so emphatically emphasized. As a matter of fact, the success of every one of these meets, viewed by the large attendance, the many new and advanced types of commercial airplanes which participated, the great number of orders placed for various models, should be one of the greatest encouragements in these actively connected with aviation and a revelation to those who do not yet know that flying is here.

Value of the Experience

The value of the experience gained cannot be over-estimated. That the general public is ready and willing to be educated to flying, and furthermore, to pay for this education, was proven beyond doubt. The fact that aviation costs today as a practical and useful part of the life of every community can no longer be denied. That the local flying club, or Chapter of Commerce in every big city or town at any one in the United States can hold a flying meet with every assurance of success—financially profitable and in countless other ways to the best interests of the city, was thoroughly demonstrated. The clubs and towns which start now to plan flying public, by means of their airports, their flying facilities and their hospitality to air travelers, will never have good cause to regret these expressions of goodwill toward the increasing number of those who love the air—and that in not distant future.

The following figures tell what happened last fall at the four flying meets—New York, Kansas City, Omaha and Baltimore. Successful flying meets are now being sprung and planned in many other towns, places for which are not included here. Red Oak, Iowa, for instance, had New York's attendance figure—and Red Oak is hardly known to the general public, except for its name during the war and the Air Meet at Goodrich, Kan., with its many deals with cups and cash prizes, attracted more visitors than Baltimore. The value is something in even, however, only the four last meets of which they had the same show.

Attendance—New York, 9,000; Kansas City, 100,000; Omaha, 60,000; Baltimore, 6,000. Total 164,000. Average daily attendance, 15,000.

Number of airplanes participating—New York, 30; Kansas City, 72; Omaha, 60; Baltimore, 25. Total, 287.

Ecologically speaking, about 250 airplanes flew over 100,000 miles during the four meetings shown. The great majority were of the open cockpit type. The most popular, probably only thirty two-seater models are held during 1922 (and this is not an exaggerated number) the total attendance, averaged 100,000 visitors and the participating machines will easily fly 350,000 miles.

As a matter of fact, a series of thirty flying meets, at the rate of one meet per week, would be about all that, under present conditions, the average community or club could be able to participate in this coming season. This indicates that the cities which are the first to recognize their place will doubtless secure the most important and the most interesting exhibits as well as the largest crowds.

Requirements of a Successful Flying Meet

Let us review the meets held last fall, and see a few of the lessons as shown by past experience. Let it be made clear that none of the references in this article are intended to be personal. It is made only with the idea of constructively benefiting future meetings.

The more successful flying meetings are made in preparation and in progress, the better they will be, not only from the

viewpoint of the spectators and the participants, but also of the local flying club or Chapter of Commerce, which conducted them. Only by a free exchange of ideas based on experience can this uniformly be achieved. New York, for example, may learn from Kansas City, Los Angeles or Dallas. The New York Meet, known as "Aerofest Day at Hither" was held on Oct. 15, 1921, under the auspices of the Aero Club of America. There was no regular program of events and no cash prizes were offered. A trophy was however awarded by the Wright Aeronautical Corp. for the best demonstration of air transport. Competitors for the Wright Trophy were permitted to carry out the tests they deemed appropriate, which some did on Saturday, the day preceding the meet.

An admission fee was charged, the proceeds going to the Aero Club for club house and other needed equipment. Nine manufacturers exhibited fifteen different types of commercial airplanes and thirty machines in all were present. Arrangements for bettering the crowd were made. Signs were stretched around the border of the field behind which the spectators were kept. The machines on exhibit were held up about 10 ft. from the nose, although not enough attention was given to keeping them in their proper places near the flying started, and none of the machines, after flight, did not return to their original places in the line.

From the "pilot's" stand, a Vineyard, very efficiently operated, announced performers in their name, and kept the spectators informed on the machines in the air, taking off and landing. The Vineyard was an electrically operated announcer by which one man may address a very large gathering, his voice being heard distinctly at a considerable distance.

At New York the organizers, the pilots, the spectators and perhaps even the Vineyard were over-worked. This was because the same show of events and demonstration flights to be clearly followed out.

In order to fill in all details, the pilots took the air continuously. Sometimes three or four very interesting flights were made, but the spectators were not permitted to change their positions from one to another quite rapidly.

Advantages of a Complete Program

The advantages of a complete program are numerous. With a less amount of aerial flying, still a better "show" is given the onlookers, and they are better able to define and understand the various types of aircraft. Then, too, some of the judges and participants, and flying rules are more easily understood, thus reducing the chance of accidents. It was demonstrated quite clearly that the program of events of future meets should be well planned, and the spectators should be kept in the line of the field, some during a race around a police course, some sort of address given should be arranged for the spectators.

In addition to the need for a complete program and regular agents, the later meets proved that New York, as well as any other city holding a flying meet, would do well to offer as much as cash prizes, cups, etc. to the contestants as possible. In addition, in recognition of the fact that the flying meet is increasing the number of exhibits, substantial prize money greater publicity, both local and national. Ten or twenty thousand dollars as prizes may obtain these thousand dollars of publicity, which is a very small sum for the thousands of people. Crowd psychology is quite interesting in this respect. Spectators will travel many miles to see one race, or even, or instead in some way for thousands of dollars of prize money. The same psychology, without the gloss

of gold, would attract a much smaller patronage. So it is, that airplane events for performing in the air should also attract widespread attention and greatly increase attendance, thereby increasing the original intended aim, more over.

New York was fairly satisfied with the development in this regard. Flying clubs taking the air in commercial flying are quite a new thing. It is not unusual to see a flying club with its plane through its own efforts as every other day and so on. In doing so, it should not overlook the fact that within the next few years the aircraft industry will become fairly well established, and the flying club will be the mainstay, the refined and the strongest backbone of the industry.

American Legion Flying Meet

The American Legion Flying Meet at Kansas City, Mo., conducted by the Flying Club of Kansas City in cooperation with the American Legion was a four-day meet, held from Oct. 31 to Nov. 2.

The program of the exhibition (both of personnel and material), hospitality to participants, and all-around off-hand the name of the Kansas City Flying Club set a record which cannot be surpassed and it is not likely to be equalled at any meet for some time to come. Needless to say, the Kansas City Meet was a tremendous success.

An admission fee was charged, proceeds going to the Kansas City Flying Club for use in the establishment of a permanent flying school and Kansas City was a great success. The club has an interest in flying with the importance of that city.

With a schedule of events far ahead every type of machine, individual club pilots and valuable trophies were offered. The flying club was a great success. The machines of about thirty different makes or types were present.

Each landing to the fields were closed for a mile or so, and in that the free lot was considerably reduced. The flying club was a great success. The machines of about thirty different makes or types were present.

The crowd was perfectly handled, not only by the local police and state troops, but also by members of the Flying Club, who voluntarily subjected themselves to real military duty in their own organization, in order to render the meet properly.

A lot of hot weather but better kept the spectators from surrounding the field. The twenty-two machines were lined up in the line of the field, the order being of the field. Each day, at 5 o'clock all flying was called off and the audience was put in their proper places in the line. The machines were then permitted to come on the field and inspect the various types of aircraft. This was a great success. The machines of about thirty different makes or types were present.

The Vineyard was kept busy and the crowd was held in place. The flying club was a great success. The machines of about thirty different makes or types were present.

It was noted that everything possible should be done to avoid a single day accident to the spectators.

Importance of Efficient Staff

The Kansas City meet demonstrated the importance of a willing and efficient personnel, properly organized and directed. The program of the exhibition (both of personnel and material), hospitality to participants, and all-around off-hand the name of the Kansas City Flying Club set a record which cannot be surpassed and it is not likely to be equalled at any meet for some time to come. Needless to say, the Kansas City Meet was a tremendous success.

In view of the success of the Kansas City Flying Club, it is not unusual to see a flying club with its plane through its own efforts as every other day and so on. In doing so, it should not overlook the fact that within the next few years the aircraft industry will become fairly well established, and the flying club will be the mainstay, the refined and the strongest backbone of the industry.

meets with the International Aero Congress. The main reason for the Flying Club's success is a good show and a good show is the main reason for the success of the Flying Club. The Flying Club is a good show and a good show is the main reason for the success of the Flying Club.

Probably fifty machines flew from Kansas City to Omaha on the afternoon of Nov. 3 and the morning of Nov. 4. All went without incident and in such a matter of fact way that the Flying Club was a great success. The machines of about thirty different makes or types were present.

Omaha must show marked by a certain lack of cooperation and attention to details which was simply detrimental to securing the best results. The experience of careful organization and well thought and preliminary preparations for the Flying Club was a great success. The machines of about thirty different makes or types were present.

One Man in Fall Authority

Now we explained the absolute necessity of having one man in charge of the Flying Club. The Flying Club was a great success. The machines of about thirty different makes or types were present.

An admission fee was charged, the proceeds going to the American Legion Flying Club. The Flying Club was a great success. The machines of about thirty different makes or types were present.

There was some delay in raising the crowd according to schedule. During these periods, various pilots voluntarily gave exhibitions and demonstrations for the spectators. The Flying Club was a great success. The machines of about thirty different makes or types were present.

Consider the Spectators

The early machines at Omaha were kept on the far side of the field, probably one quarter mile away from the spectators. It is much more interesting to have them lined up, before the start, than to have them lined up, after the start. And a line of machines is made possible by the spectators, and they should be considered first.

The fact that flying rules were not observed, most of the crowd being in the line of the field, was a great success. The machines of about thirty different makes or types were present.

of the machine. Such gliding, even with an overhead machine and the best possible wind machine, has never yet produced satisfactory results. Especially the best handling of the best machine yet produced has not yet given soaring flight in an appreciable wind.

It is interesting that at the same time one should have the three indispensable conditions of (a) A suitable wind, where internal energy tends to produce gliding; (b) Piloting sufficiently skilful to adjust the internal wind energy; and (c) A machine of really low resistance, and, very particularly, of high maneuvering qualities. As to the wind there are three types which under ordinary conditions, that is, under normal circumstances due to the slope of the ground, second, gusts as a horizontal or nearly horizontal wind, and third, winds of varying direction at varying altitudes.

Soaring in a vertical wind should not properly be described as such. It is really only gliding flight in a vertical wind. Aerodynamically and mechanically such flight is identical with the ordinary gliding flight, with the sole difference that the wind has a vertical velocity, and in so-called "soaring" it is often an air draft. The height will never lead to true soaring and its only value seems to be that of proving experience in piloting and adjusting the equipment of the machine. True soaring flight, with the objective of the present German experiments, is flight by the use of the energy of a gusty wind, generally horizontal. Klemperer's 1926, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 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192. The testing took place between these wires and pins up one or more of the altimeter wires. The readings on the ends of these wires immediately after a dip in the plane which brought it slowly to rest. When the test drops, the hooks on the tail still engage in the line and all wires thus preventing the airplane from going over on its nose. In case the airplane falls entirely onto the platform it is brought to rest on the far ramp by the action of the side hooks which are engaged on the fore and aft wires. With the assistance of this device an expert pilot could land on the deck of the Langley with every assurance of not crashing over its side. The ship would be brought into the wind thus reducing the relative speed over the deck of the airplane and facilitating the landing.

With the successful demonstration of the U. S. Navy catapult for launching airplanes (illustrated on the cover), it is now practicable to equip with airplanes the major ships at the fleet. When carriers with armament devices are available, the battleship airplanes will probably be launched from battleships by means of their catapults, will accomplish their mission and will land on the decks of the airplane-carriers available. Naturally, the airplane carriers will operate their own complement of airplanes.

Preparation and Use of Glue

The following extract from Prof. Jackson's "Report on the Materials of Construction Used in Aircraft and Aircraft Engines" was originally due to Lord Rowland, and is issued in the form of a Technical Memorandum for the information of the people concerned—

Preparation of Glue for Use. The best method to prepare glue for use is to break the glue into small pieces (about the size of peas) and to soak them in room temperature for 24 hours. The glue in this time will have absorbed enough water to form a solution where heated. Hence, no more of the soaking water should be thrown away, and the soaked pieces of glue should be transferred to, and melted in the familiar water-jacketed glue pot. The heating or melting process should be conducted as quickly as possible without boiling the water in the glue pot jacketed furnace, and the contents of the glue pot should be used to a temperature

between 60 deg. C. and 80 deg. C. (140 deg. F. and 175 deg. F.) when the melted glue should be ready for assembly use. The longer the "soak" the warmer should be the glue, within the above limits. If glue is heated more (less about 5 deg. it becomes steadily weaker. Prolonged heating may cause the formation of substances such as Meulin (a non-dissolvable), though such products may also be present as a glue going to a method of manufacture. These glues, for example, have few drawbacks when the tanks have not been carefully washed after heating. Stale glue should not be used, and fresh glue should be added to previously heated glue. Only old, flaccid glue for the work required should be prepared, and any surplus glue should be thrown away.

Method of Using Glue. The glue solution, once it has become hot, should not be allowed to cool, so melted glue has not the same tenacity as a freshly prepared solution. Whenever possible the wood should be warmed slightly to avoid shrinking the glue. On the other hand the wood must not be too hot, as very hot wood rapidly absorbs the water in the glue, causing the glue to dry too quickly, with the result that a weak joint is obtained.

The fibres of the wood to be joined together should be made as dry as possible, if possible, they should be lightly coated with a fine finishing plane. The room in which the gluing is done should be at a temperature not below 70 deg. C. and free from draughts. The joint, when made, should be placed up for at least 12 hr. after which the clamps may be removed, but the joint must be allowed to set at least another 24 hr. before it is subjected to any stress.

It is generally recognized that the quality of a glue joint is very dependent on the experience of the operator; but it may be assumed that the more a glue penetrates into the pores of the wood the more efficient is the joint, always providing that sufficient glue remains between the surface of the wood in order to form the joint. Good penetration is always obtained with a new effect do not set too rapidly.

In gluing great care should be taken to avoid the formation of air bubbles, which are the source of considerable trouble, and frequently cause the failure of a joint. Air bubbles are due sometimes to bad glue brush manipulation, and sometimes to frothing or foaming, objectionable properties which are present in some kinds of glue.

—and continue Technical Memorandum

Air Traffic Control at Croydon Airport

Interesting Photographs Show How Incoming and Outgoing Aircraft are Directed from Central Control Tower

The photographs below show some details of the air traffic controller's office at Croydon, the airport of London. This establishment is absolutely unique at present, but is a model of what we will see all over the world in the near future.

It is the function of the air traffic controller to direct the movement of incoming and outgoing machines. This he does by a variety of means. When the machine is near he uses to employ a microphone to give the pilot his instructions without the pilot having to come to him for conversation.

but the landing and taking off represents a very serious problem. During the war at the Army training field many accidents occurred on the ground due to lack of proper surveillance to rules and regulations. Under great precautions are taken, accidents may occur at commercial airports and this will prove a serious detriment to commercial air transport. As is shown by the New York Traffic Control system installed, central control of the whole traffic is practically essential. Around a city like New York, in the morning and in



The upper left hand view shows the air traffic controller signaling to the pilot of an approaching airplane by means of the special flashlight. At the upper right is shown a ground view of the landing. The view at the lower left shows the controller giving instructions to an airplane about to land, by means of the landing lights. The wind indicator is seen in the upper right hand corner of the view. The lower right hand view shows the air traffic controller giving information and instructions to an incoming airplane by means of the window telephone extension.

THE CONTEST COMMITTEE of the AERO CLUB OF AMERICA

Requests of every (individuals or companies) of interest in the United States to register an entry that the Committee may

1. Send, gratis, the Aero Club's Contest Rules for 1932, and action of proposed aviation records.
2. Assist local Clubs in organizing contests best adapted to the types of airplanes in their locality.
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Motor, Make and Model

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Capacity of maximum flights of

Cubic capacity of gas tank

Endorsement: Licenseholder's Aircrafts Registered No.

Pilot's name

Address

Owner's name

Address

the evening there will be great congestion from private machines taking people to and from their places of business. These machines will be very difficult to control. The success of these machines are today many automobiles and they are the principal offenders against the traffic rules. The experience gained at Croydon will prove valuable in the future not only to England but other nations as well.

Dryden-Wright School to Reopen

The Dryden-Wright Co. announces resumption of its training school which was abandoned upon our entry into the late war. Applications for enrollment are being received now for the course of training which is to be inaugurated on May 1st with a grand new improvement, both in the matter of facilities and planes, over anything in the past.

With adequate housing arrangements, the use of the improved transport system, instruction and student welfare side by side in the training plane and each group getting individual instruction, a large class is already looking forward to May

In the future, large cities will have a very serious problem on their hands in dealing with the air traffic at their airports. The traffic in the air is comparatively easy to handle,

Foreign News

China

Air Service officers returning from leave in North China report conditions ideal for the development of aviation. North China has great areas of level open country. Fortunately for aviation, the Chinese live in communities, so their mud houses are not scattered over the country side, but collected in small groups behind a stone wall. Graves of the millions of Chinese dead are scattered promiscuously over the country side and obstruct many otherwise perfect sites. They also reported weather conditions ideal in Peking and Shanghai during the months of October and November.

France

In his report on the air budget M. Bouillon-Laffont points out the extraordinarily small percentage of accidents in French commercial aviation.

In the period from Jan. 1 to Nov. 30, 1921, on aerial lines whose point of departure is in France 1,672,000 miles have been covered, and 16,166 passengers, irrespective of pilots and mechanics, have been transported. Only ten accidents have been recorded, involving the death of seven passengers and four pilots, while only two passengers and three pilots have been injured. These figures give an average of one killed in every 2300 and one injured in every 8083 passengers carried.

Great Britain

Regular service across the English Channel by air will take place this winter for the first time in aviation history. The *London Daily Chronicle* states that arrangements have been made between the Instone and Handley-Page lines to fly six days in the week from both Paris and London. Machines will leave Paris and London simultaneously, pass in mid-Channel, and arrive at their destinations about 2:30 p. m. This will avoid night flying and will be the first time that such extended winter facilities have been afforded the public. Last winter the service of the Handley-Page Company was only twice weekly.

Road surveying by airplane is an innovation shortly to be introduced by the Ministry of Transport. The experiment is to be carried out in connection with the new London to Southend road. The idea is to get maps of the whole of the proposed course for the road. It is estimated that the actual time occupied in photographing the course will be less than 30 min., which will effect a considerable saving of time and expense, for instead of numbers of men having to tramp the country, two or three men will merely have to fly over the course taking a series of photographs as they go. When the photographs are laid side by side it should be possible to have before one a bird's eye view of the whole of the site for the proposed road.

"Outspinning the Spider"

An American industrial romance of wire rope and cable, as developed and perfected by John H. Roebling and his sons from 1831 to date, is told in a pamphlet by John K. Munford, recently published. In mentioning Roebling, the popular mind reverts at once to the Brooklyn Bridge made possible by his genius. But wire rope and cable is now interminably woven into the life and industrial development of the world. In war the Roeblings supplied uncounted thousands of tons first to the allies, and then to the United States. Of special interest to the aircraft field is the fact that beginning with the experiments of the Wrights the Roeblings have been the principal source of aircraft strand wire, and it was their special knowledge that gave to the allies and the United States an enormous production of this material for their training and combat aircraft.

The brochure is in keeping with the prestige of the House of Roebling and is an excellent addition to the industrial literature of the times.

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